

PATENT APPLICATION TRANSMITTAL LETTER

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Transmitted herewith for filing is the Patent Application of
SHUH-REN KUO; CHRIS WANG; LEO KUANfor
USB-BASED WIRELESS TRANSMITTING/RECEIVING SYSTEM

Enclosed are:

 4 sheets of drawings an assignment of the invention to
BEHAVIOR TECH COMPUTER CORPORATION a certified copy of a _____ application associate power of attorney a verified statement to ascertain small entity status under 37 CFR § 1.9 & 1.27jc598 U.S. PTO
09/536599
03/28/0009/536599
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| TOTAL CLAIMS | 9 -20 | 0 | x 18 | 0 |
| INDEPENDENT CLAIMS | 1 -3 | 0 | x 78 | 0 |
| MULTIPLE DEPENDENT CLAIM PRESENT | | | \$260 | 0 |
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3/27/2000

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Winton S. Dosey

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USB-BASED WIRELESS TRANSMITTING/RECEIVING SYSTEM

FIELD OF THE INVENTION

The present invention generally relates to a wireless transmitting/receiving system, and in particular to a wireless connection between USB-based computer peripheral devices and a computer host.

BACKGROUND OF THE INVENTION

Conventionally, a computer communicates with peripheral devices via cables or wires. The cable or wire that connects a peripheral device to a computer host via interface circuit and buses. RS-232 is one of the conventional interfaces incorporated in a computer for communication with peripheral devices. High speed interfaces, such as Universal Serial Bus (USB), are being developed to replace the conventional RS-232 for providing high speed data transmission.

Figure 1 of the attached drawings shows a known configuration of USB-based connection between a computer host 12 and peripheral devices, such as a keyboard 13, a mouse 14, a joystick 15 and a printer 16. The USB-based connection comprises a USB hub 10 connected to the computer host 12 by a USB cable 11. The peripheral devices 13-16 are connected to the hub 10 by cables (not labeled) of their own. The cables connecting the hub 10, the computer host 12 and the peripheral devices 13-16 interfere with the activity of a computer user and limit maneuverability of the peripheral devices. The distance between the peripheral devices and the computer host is limited by the length of the cables.

To solve the problems, a USB-based wireless transmitting/receiving system is provided by the present invention for forming a wireless connection between a computer host and at least one peripheral device.

SUMMARY OF THE INVENTION

5 Accordingly, an object of the present invention is to provide a USB-based wireless transmitting/receiving system for forming a wireless connection between a computer host and a peripheral device.

Another object of the present invention is to provide a wireless connection between a computer host and a peripheral device, the wireless 10 connection having a simple structure and allowing high speed data transmission.

To achieve the above objects, in accordance with the present invention, there is provided a USB-based wireless transmitting/receiving system comprising a transmitting portion connected to at least one 15 USB-based peripheral device for receiving a signal from the peripheral device and a receiving portion connected to a computer host and coupled to the transmitting portion in a wireless fashion for receiving and applying the signal from the transmitting portion to the computer host whereby a wireless communication is established between the computer host and the 20 USB-based peripheral device. Both the transmitting portion and the receiving portion comprise a central processing unit for processing signals received, a receiving unit for receiving signals, a transmitting unit for transmitting signals and a power supply system for powering the transmitting portion or the receiving portion. The power supply system 25 comprises a regulation circuit adapted to connect to an electric main. The power supply system may selectively include a primary battery set, a secondary battery set and/or a solar cell system, all connected to a

controller to which the regulation circuit is also connected for selectively powering the transmitting portion or the receiving portion.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be apparent to those skilled in the art by
5 reading the following description of a preferred embodiment thereof, with
reference to the accompanying drawings, in which:

Figure 1 is a schematic view showing a conventional USB-based connection between a computer host and peripheral devices;

Figures 2 is a schematic view showing a USB-based wireless
10 transmitting/receiving system arranged between a computer host and peripheral devices in accordance with the present invention;

Figure 3 is a block diagram showing a transmitting portion of the USB-based wireless transmitting/receiving system in accordance with the present invention; and

15 Figure 4 is a block diagram showing a receiving portion of the USB-based wireless transmitting/receiving system in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings and in particular to Figure 2, wherein
20 a USB-based wireless transmitting/receiving system constructed in accordance with the present invention, generally designated by reference numeral 20, is shown for forming a wireless connection between a computer host 42 and peripheral devices, such as a keyboard 22, a mouse 23, a joystick 24, a writing pad 25 and a game controller 26, the
25 USB-based wireless transmitting/receiving system 20 comprises a

transmitting portion 21 coupled to the peripheral devices 22-26 and a receiving portion 40 connected to the computer host 42 by a USB cable 41 whereby signals from the peripheral devices 22-26 are transmitted by the transmitting portion 21 to the computer host 42 via the receiving portion

5 40.

Signal transmission between the transmitting portion 21 and the receiving portion 40 may be done by any known means, such as consumer infra-red transmission, Irda-based transmission and unidirectional and bi-directional radio frequency (RF) transmission.

10 Figure 3 shows an embodiment of the transmitting portion 21. The transmitting portion 21 comprises at least a central processing unit 27, a transmitting unit 28, a receiving unit 29 and a power supply system 30. The central processing unit 27 receives and processes signals from the peripheral devices 22-26. The transmitting unit 28 is connected to the central processing unit 27 and transmits the processed signals to the receiving portion 40. The receiving unit 29 receives signals issued by the computer host 42 and transfers the signals to the central processing unit 27.

15 The power supply system 30 is coupled to the central processing unit 27 for powering the central processing unit 27. The power supply system 30 may comprise any suitable electrical/electronic devices. In the embodiment illustrated, the power supply system 30 is adapted to be connected to an electric main, such as a wall outlet (not shown), for receiving alternate current therefrom. The power supply system 30 20 comprises a controller 32 which is coupled to the electric main via a regulation circuit 31. The regulation circuit 31 receives and regulates the alternate current from the electric main and supplies, under the control of the controller 32, the regulated power to the central processing unit 27.

The power supply system 30 further comprises an auxiliary power supply unit selectively including a primary battery set 34, a secondary battery set 35 and a solar cell system 33. The primary battery set 34, the secondary battery set 35 and the solar cell system 33 are all connected to
5 the controller 32 whereby the controller 32 may selectively supply power to the central processing unit 27 from the electric main, the primary battery set 34, the secondary battery set 35 and the solar cell system 33.

Figure 4 shows an embodiment of the receiving portion 40. The receiving portion 21 is coupled to the computer host 42 and comprises at
10 least a central processing unit 43, a receiving unit 44, a transmitting unit 45 and a power supply system 46. The central processing unit 43 receives and processes signals that are transmitted from the peripheral devices 22-26 via the transmitting portion 21 and received by the receiving unit 44 thereof. The transmitting unit 45 is connected to the central processing
15 unit 43 and transmits signals from the central processing unit 43 to the peripheral devices 22-26 via the transmitting portion 21.

The power supply system 46 is coupled to the central processing unit 43 for powering the central processing unit 43. The power supply system 46 may comprise any suitable electrical/electronic devices. In the embodiment illustrated, the power supply system 46 is adapted to be connected to an electric main, such as a wall outlet (not shown), for receiving alternate current therefrom. The power supply system 46 comprises a controller 48 which is coupled to the electric main via a regulation circuit 47. The regulation circuit 47 receives and regulates the
20 alternate current from the electric main and supplies, under the control of the controller 48, the regulated power to the central processing unit 43.
25

The power supply system 46 further comprises an auxiliary power supply unit selectively including a primary battery set 50, a secondary

battery set 41 and a solar cell system 49. The primary battery set 50, the secondary battery set 51 and the solar cell system 49 are all connected to the controller 48 whereby the controller 48 may selectively supply power to the central processing unit 43 from the electric main, the primary battery set 50, the secondary battery set 51 and the solar cell system 49.

In an initial set-up operation of the wireless transmitting/receiving system, a peripheral device, such as the keyboard 22, is connected to the transmitting portion 21. The transmitting portion 21 detects the insertion of the peripheral device and requests the peripheral device to provide a signal for identifying the type thereof. The signal is then transmitted to the receiving portion 40 which in turn applies the signal to the computer host 42.

In a normal operation, the peripheral device generates data to the transmitting portion 21. The transmitting portion 21 processes and transmits the data in wireless fashion to the receiving portion 40. The receiving portion 40 processes and transmits signals received from the transmitting portion 21 to the computer host 42.

If the peripheral device is a USB Human Input Device (HID), the peripheral device is capable to enter a suspend mode for the purposes of saving power consumption when no input from a user has been detected after a given period. Once a signal is detected, for example one key of the keyboard 22 is struck, a remote wake up function is initiated and transmitted through the transmitting portion 21 and the receiving portion 40 to the computer host 42.

It can be understood from the above description of a preferred embodiment that the present invention possesses all the advantages that can be observed in a wire-connected USB system as well as the benefits provided by a wireless system. The advantages include at least:

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- (1) A single connection device allows the connection with all types of USB-based device.
- (2) The number of the USB-based devices connected together is not limited.
- 5 (3) It is capable to automatically detect and configure the peripheral devices connected to a computer host, namely the “plug-and-play” function.
- 10 (4) It is capable to support new USB-based devices and allows upgrading.
- 10 (5) It allows the system to enter the suspend mode for power saving purposes.
- 10 (6) It allows remote wake up.

Although the present invention has been described with reference to the preferred embodiment thereof, it is apparent to those skilled in the art 15 that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

WHAT IS CLAIMED IS

1 1. A USB-based wireless transmitting/receiving system comprising:
2 a transmitting portion adapted to be connected to at least one
3 USB-based peripheral device for receiving a signal from the
4 peripheral device;
5 a receiving portion adapted to be connected to a computer host and
6 coupled to the transmitting portion in a wireless fashion for
7 receiving and applying the signal from the transmitting portion to
8 the computer host whereby a wireless communication is
9 established between the computer host and the USB-based
10 peripheral device.

1 2. The USB-based wireless transmitting/receiving system as claimed in
2 Claim 1, wherein the wireless coupling between the transmitting
3 portion and the receiving portion comprises infrared transmission.

1 3. The USB-based wireless transmitting/receiving system as claimed in
2 Claim 1, wherein the wireless coupling between the transmitting
3 portion and the receiving portion comprises radio frequency
4 transmission.

1 4. The USB-based wireless transmitting/receiving system as claimed in
2 Claim 1, wherein the transmitting portion comprises a central
3 processing unit to which a transmitting unit and a receiving unit are
4 connected and a power supply system for powering the central
5 processing unit.

1 5. The USB-based wireless transmitting/receiving system as claimed in
2 Claim 4, wherein the power supply system comprises a controller to
3 which a primary power source and an auxiliary power source are

connected whereby the controller selectively supplies power from the primary power source and the auxiliary power source to the central processing unit.

6. The USB-based wireless transmitting/receiving system as claimed in
Claim 5, wherein the auxiliary power source selectively comprises a
primary battery set, a secondary battery set and a solar cell system.
7. The USB-based wireless transmitting/receiving system as claimed in
Claim 1, wherein the receiving portion comprises a central processing
unit to which a transmitting unit and a receiving unit are connected
and a power supply system for powering the central processing unit.
8. The USB-based wireless transmitting/receiving system as claimed in
Claim 7, wherein the power supply system comprises a controller to
which a primary power source and an auxiliary power source are
connected whereby the controller selectively supplies power from the
primary power source and the auxiliary power source to the central
processing unit.
9. The USB-based wireless transmitting/receiving system as claimed in
Claim 8, wherein the auxiliary power source selectively comprises a
primary battery set, a secondary battery set and a solar cell system.

USB-BASED WIRELESS TRANSMITTING/RECEIVING SYSTEM

ABSTRACT OF THE DISCLOSURE

A USB-based wireless transmitting/receiving system includes a transmitting portion connected to at least one USB-based peripheral device for receiving a signal from the peripheral device and a receiving portion connected to a computer host and coupled to the transmitting portion in a wireless fashion for receiving and applying the signal from the transmitting portion to the computer host whereby a wireless communication is established between the computer host and the USB-based peripheral device. Both the transmitting portion and the receiving portion include a central processing unit for processing signals received, a receiving unit for receiving signals, a transmitting unit for transmitting signals and a power supply system for powering the transmitting portion or the receiving portion. The power supply system includes a regulation circuit adapted to connect to an electric main. The power supply system may selectively include a primary battery set, a secondary battery set and/or a solar cell system, all connected to a controller to which the regulation circuit is also connected for selectively powering the transmitting portion or the receiving portion.

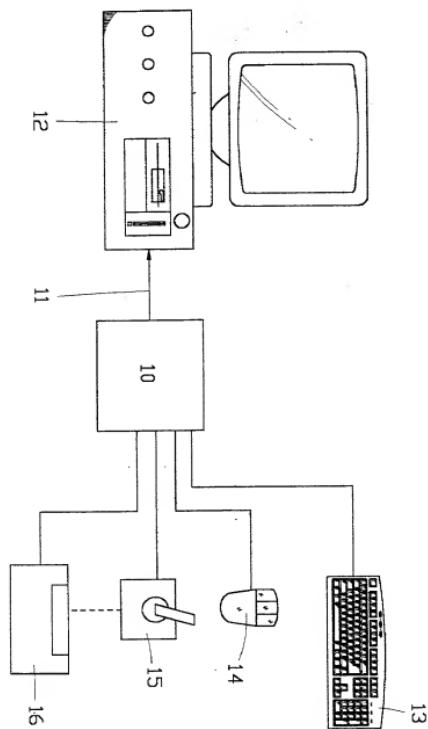


FIG.1

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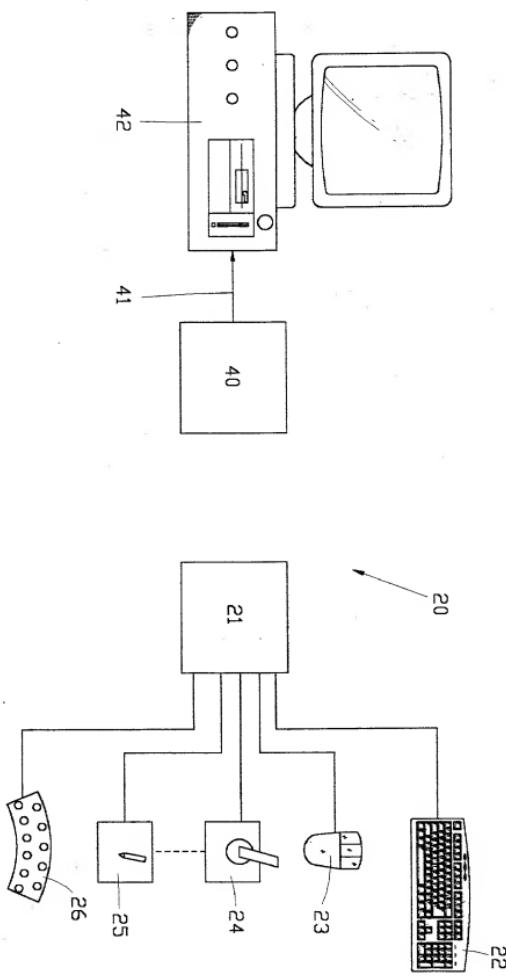


FIG.2

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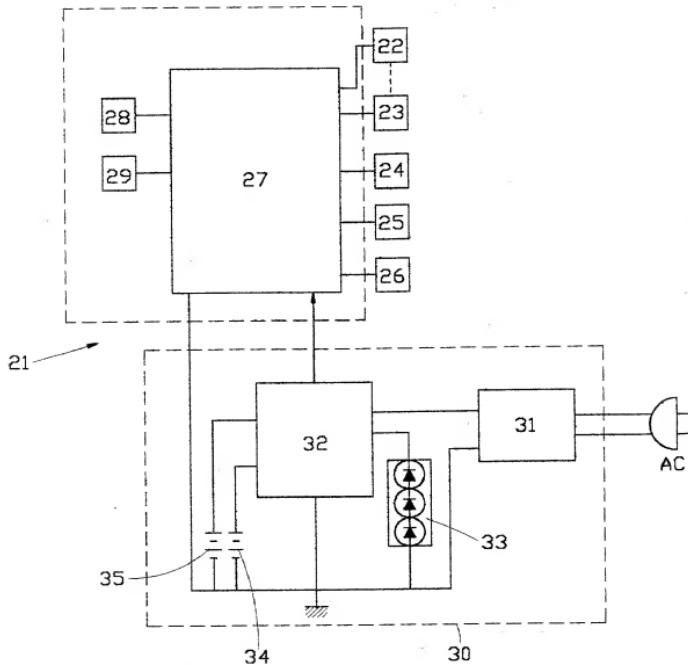


FIG.3

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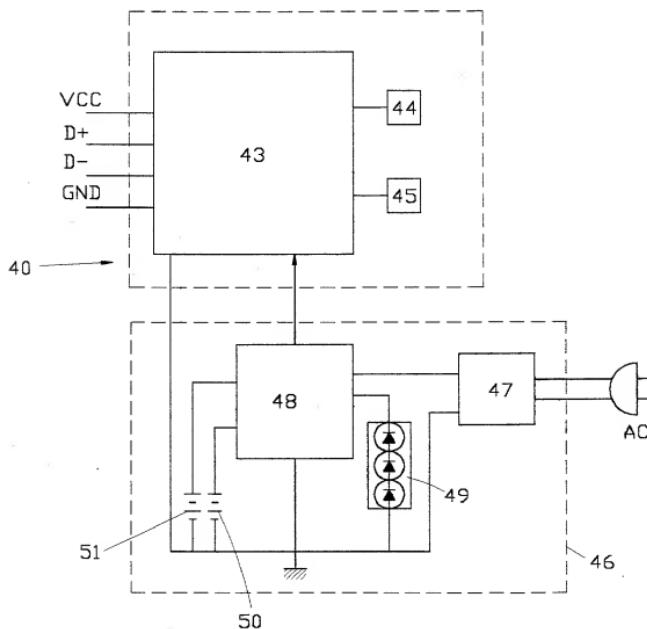


FIG.4

DECLARATION FOR PATENT APPLICATION

Docket Number (Optional)

MR1115-248

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled
USB-BASED WIRELESS TRANSMITTING/RECEIVING SYSTEM, the specification of which is attached hereto unless the following box is checked:

was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I hereby claim foreign priority benefit under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

| | | | |
|----------|-----------|------------------------|--------------------------|
| (Number) | (Country) | (Day/Month/Year Filed) | <input type="checkbox"/> |
|----------|-----------|------------------------|--------------------------|

| | | | |
|----------|-----------|------------------------|--------------------------|
| (Number) | (Country) | (Day/Month/Year Filed) | <input type="checkbox"/> |
|----------|-----------|------------------------|--------------------------|

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

| | |
|----------------------|---------------|
| (Application Number) | (Filing Date) |
|----------------------|---------------|

| | |
|----------------------|---------------|
| (Application Number) | (Filing Date) |
|----------------------|---------------|

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

| | | |
|----------------------|---------------|---------------------------------------|
| (Application Number) | (Filing Date) | (Status-patented, pending, abandoned) |
|----------------------|---------------|---------------------------------------|

| | | |
|----------------------|---------------|---------------------------------------|
| (Application Number) | (Filing Date) | (Status-patented, pending, abandoned) |
|----------------------|---------------|---------------------------------------|

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: MORTON J. ROSENBERG, ESQ., REG. # 26,049;

Address all telephone calls to MORTON J. ROSENBERG at telephone number 410-465-6678

Address all correspondence to ROSENBERG, KLEIN & LEE

3444 ELLICOTT CENTER DRIVE-SUITE 105

ELLICOTT CITY, MD 21043

FAX #: 410-461-3067

E-MAIL ADDRESS: rkl@rkpatlaw.com

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of solo or first inventor (given name, family name) SHYH-REN KUO (KUO IS FAMILY NAME)

Inventor's signature Shyh-Ren Kuo Date 3/21/2000

Residence Same as Post Office Address Citizenship Taiwan, R.O.C.

Post Office Address 5F. NO. 52, ANSHING STREET, NEIHU, TAIPEI, TAIWAN 114, R.O.C.

Full name of second joint inventor, if any (given name, family name) CHRIS WANG (WANG IS FAMILY NAME)

Second Inventor's signature Chris Wang Date 3/21/2000

Residence Same as Post Office Address Citizenship Taiwan, R.O.C.

Post Office Address 3F. NO. 72, CHIZHI STREET, SHULIN, TAIPEI, TAIWAN 238, R.O.C.

Additional Inventors are being named on separately numbered sheets attached hereto.

| | | |
|----------------------|-------------------------------------------------------------------|-----------|
| Third Joint Inventor | LEO KUAN (KUAN IS FAMILY NAME) | 3/21/2000 |
| Inventor's Signature | <i>Leo Kuan</i> | |
| Residence | Same as Post Office Address | |
| Citizenship | Taiwan, R.O.C. | |
| Post Office Address | 2F. NO.12, LANE 97, JINGSHING STREET, WENSHAN, TAIPEI 116, R.O.C. | |

| | |
|-----------------------|------|
| Fourth Joint Inventor | |
| Inventor's Signature | Date |
| Residence | |
| Citizenship | |
| Post Office Address | |

| | |
|----------------------|------|
| Fifth Joint Inventor | |
| Inventor's Signature | Date |
| Residence | |
| Citizenship | |
| Post Office Address | |

| | |
|----------------------|------|
| Sixth Joint Inventor | |
| Inventor's Signature | Date |
| Residence | |
| Citizenship | |
| Post Office Address | |